AMENDMENT

In the Claims:

These claims replace all prior versions and listings of claims in the above-referenced application.

1. – 25. (Canceled)

26. (New) A multiprocessor system, comprising:
a plurality of processors that operate in parallel;
a plurality of agents comprising agent data ports coupled to respective processors;
a plurality of memory controllers coupled to each of the plurality of agents via the agent data ports;
a plurality of memory units coupled to respective memory controllers; and
at least one crossbar comprising crossbar data ports coupled to a plurality of agents via respective crossbar data ports and agent data ports.

27. (New) The system of claim 26, wherein the agents and the at least one crossbar comprise routing logic and return routing logic.

28. (New) The system of claim 27, wherein the routing logic decrements a current hop count.

29. (New) The system of claim 27, wherein the routing logic directs the transmission of a packet via a select port responsive to the current hop count.

30. (New) The system of claim 27, wherein the return routing logic records a return route in the data packet as the data packet traverses the route to its respective destination.

31. (New) The system of claim 27, wherein the return routing logic inserts an ingress port indicator into the data packet header, the indicator responsive to the port where the data packet was received.

32. (New) The system of claim 27, wherein the agents further comprise a routing table.

33. (New) The system of claim 32, wherein the routing table comprises at least one route from the source device to the destination device.

34. (New) The system of claim 27, wherein the agents further comprise source logic.

35. (New) The system of claim 34, wherein the source logic identifies a route communicated via a data packet header comprising an egress data port of a next subsequent device along the route, a current hop count, and a total number of hops in the route.

36. (New) The system of claim 27, wherein the agents further comprise destination logic.

37. (New) The system of claim 36, wherein the destination logic examines a data packet to determine if the packet has reached a designated destination.

38. (New) The system of claim 36, wherein the destination logic swaps an ingress port indicator with an egress port indicator in a data packet header when the current hop count exceeds a threshold value.

39. (New) The system of claim 27, wherein the agents further comprise return route reconstitution logic.

40. (New) The system of claim 39, wherein the return route reconstitution logic identifies a source data port of a received data packet and writes the source port over a destination port.

41. (New) The system of claim 39, wherein the return route reconstitution logic generates an acknowledgement packet.

42. (New) The system of claim 41, wherein the acknowledgement packet reverses the order of destination ports along the route and resets a current hop count.

43. (New) The system of claim 26, wherein the at least one crossbar routes a data packet from a first agent to a second agent pursuant to routing logic.

44. (New) The system of claim 26, wherein the agents route a data packet from a first memory controller to a second memory controller pursuant to routing logic.

45. (New) The system of claim 26, wherein the agents and the memory controllers comprise source logic, destination logic, return route reconstitution logic and a routing table.

46. (New) The system of claim 45, wherein the routing table comprises at least one of a destination identifier, a crossbar identifier, destination ports, and a total hops value.

47. (New) A method for communicating data between devices in a parallel processing system, comprising:

providing a plurality of processors and memory units;

coupling an agent and a memory controller between each of the plurality of processors and memory units;

coupling at least one crossbar between each of the agents;

using source logic within the agents to generate a data packet to transmit data from a source device to a destination device via the at least one crossbar, wherein the source device comprises one of a memory unit and a processor and a destination device comprises one of a processor and a memory unit, respectively;

identifying a particular data route from the source device to the destination device through the at least one crossbar, the data route being communicated via a header associated with the data packet, the header comprising an egress port, a current hop count, and a total number of hops in the data route;

routing the data packet along the data route in response to the egress port; and

detecting the arrival of the data packet at the destination node.

48. (New) The method of claim 47, further comprising:

recording an ingress port indicator responsive to the port where the data packet was received along the data route.

49. (New) The method of claim 47, wherein identifying a particular data route from the source device to the destination device through the at least one crossbar comprises examining a routing table containing at least one of a destination identifier, a crossbar identifier, destination ports, and a total hops value.

50. (New) The method of claim 47, wherein routing the data packet along the data route comprises decrementing the current hop count.

51. (New) The method of claim 47, wherein routing the data packet along the data route comprises replacing an ingress port indicator with an egress port indicator the header when the current hop count falls below a threshold value.

52. (New) The method of claim 47, further comprising:

acknowledging receipt of the data packet at the destination node by resetting the current hop count to the total hop count and swapping an ingress port indicator with an egress port indicator.

53. (New) The method of claim 52, wherein acknowledging receipt is accomplished independent of the state of a routing table in the destination device.

D' cncl.

54. (New) The method of claim 52, wherein acknowledging receipt further comprises checking for a timeout.

55. (New) The method of claim 54, further comprising:

using source logic within an agent to identify a next best data route for transferring data from the source device to the destination device in response to the timeout; and

generating a replacement data packet having an egress port indicator, a current hop count, and a total hop count, the data packet responsive to the next best data route.